

PATENT SPECIFICATION

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(54) FASTENING ASSEMBLY AND AN ADAPTOR THEREFOR

(71) We, WARREN FASTENER CORPORATION, a corporation organised and existing under the laws of the State of Michigan, United States of America, of 80 North Rose Street, Mount Clemens, Michigan, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a fastening assembly and to an adaptor therefor, and is described hereinafter by way of example with reference to the attachment of trim strip to motor car body panels.

According to one aspect of the present invention, there is provided a resilient adaptor for fastening a hollow member to a support which has a surface to which two spaced apart male elements have been attached, each of the male elements having an enlarged head spaced from the surface of the support, the adaptor having two spaced apart slots each bounded by a seat portion adapted to be received under the head of one of said male elements, the slots being so angularly disposed in relation to one another that with a first one of the said seat portions received under the head of one of said male elements, the adaptor can be swung about such element to cause the other seat portion to be received under the head of the other male element, the adaptor also comprising means for inhibiting the withdrawal of said other seat portion from the head of the male element under which it has been received to restrain accidental detachment of the adaptor from the male elements.

According to another aspect of the present invention, there is provided a fastening assembly comprising a support from a surface of which two headed male elements are secured with their heads spaced from the surface, an adaptor as set forth in the last preceding paragraph with its seat portions received under the heads of said elements, and a hollow member mounted on the adaptor.

Preferably, the male fastener elements

referred to take the form of buttons attached to a support in accordance with the method described in British Patent Specification No. 945,924, wherein the button is welded to steel or adhesively secured to various materials including steel, thereby eliminating the corrosion problems inherent in previously used techniques requiring a hole through the support. A series of spaced buttons for a single longitudinal trim strip can be applied in a "gang" operation with accurate alignment.

A suitable size of button for use in motor car manufacture is one 0.200 inches in diameter at its head end and 0.160 inches in height, the shank of the button being slightly greater in diameter than one-half that of the head.

Utilisation of the present invention for trim strip attachment provides certain advantages over previous methods.

An adaptor and fastening assembly in accordance with the invention will be described, merely by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a plan view of the exemplary adaptor;

Figure 2 is a side view of the exemplary fastening assembly using the adaptor of Figure 1;

Figure 3 is a sectional view of the adaptor shown in Figure 1, taken along the line 3-3 of Figure 1;

Figure 4 is an end view of the adaptor shown in Figure 1;

Figure 5 is a sectional view of the adaptor taken along the line 5-5 of Figure 1;

Figure 6 is a sectional view of the adaptor shown in Figure 1, taken along the line 6-6 thereof, and

Figures 7 to 9 are plan views illustrating the method of fastening the adaptor to a support.

Referring first to Figure 2, there is shown the exemplary fastening assembly with a support 22 and trim strip 30 in section and the exemplary adaptor 20 in elevation. The support 22 is a motor car body panel.

Projecting from a surface of the support 22 are two buttons 24 each consisting of a shank 28 which is welded to the support 22 in accordance with the method described in the above-referenced patent specification, and an enlarged head 26 spaced by the shank from the surface of the support 22.

The adaptor 20 has a non-metallic resilient body portion 40 provided with two spaced substantially keyhole-shaped slots 42 and 44. The first keyhole slot 42 has a head portion 52 and a narrow stem portion 56, and the slot 42 is defined in a U-shaped tongue portion 46 resiliently joined to the body portion 40 by arms 48 and accommodated in an aperture in the body portion 40. An inclined ramp 50 is provided between the head portion 52 of the slot 42 and a button seat 54 bounding the stem portion 56. The adaptor 20 is thereby biased toward the support 22 as the adaptor is shifted to seat a button 24 on the button seat 54, as will be described in more detail below.

The second slot 44 is angularly disposed substantially perpendicularly in relation to the first slot 42. The second slot 44 is provided with a head portion 60. A narrow stem portion 61 and an inwardly extending finger 58 which restricts the communication between the head portion 60 and a button seat 62 defined around the stem portion 61. The finger 58 is resiliently joined to the body portion 40 of the adaptor at 64, and slants inwardly at an acute angle with the slot as shown in Figure 1. The slot 44 is arcuate so that with the button seat 54 bounding the first slot 42 under the head of one of the buttons, the adaptor can be swung to introduce the other button along the second slot to a button seat 62.

It will be understood that the resilient finger 58 is easily flexed out of its restricting position, as illustrated in Figure 1, as the adaptor 20 is shifted to seat a said button 24 on the button seat 62, but will inhibit withdrawal of the button 24 from its seat 62. The second slot 44 also has an inclined ramp 66 which biases the adaptor toward the support as the button is seated on the button seat 62.

The base of the adaptor 20 is provided with a pair of longitudinally extending ribs 67, which provide a frictional face-to-face engagement of the adaptor with the support 22 when the adaptor 20 is biased toward the support 22. This engagement tends to prevent detachment of the adaptor under vibrational and other forces. The body portion of the adaptor is provided with a pair of downwardly extending fins 68.

The body portion 40 is also provided with pairs of oppositely tapered walls 74, 75 and 78, 82 respectively, at each end face thereof (Figure 2), the fins 68 swing along the lower edges of the walls.

The trim strip 30 is a longitudinally extending substantially channel-shaped member having in-turned longitudinally extending flanges 70 and 72 at opposite sides thereof, as shown in Figure 2.

On installation, one of the flanges, e.g. the flange 70, is moved against the wall 74 of the body portion 40. The other flange 72 is then pressed against the tapered wall 78, whereby to compress the trim strip 30. The flange 72 is then moved past the side wall 78 and will spring into engagement with the wall 82 on the opposite side of the body 40. In the assembled position, the tapered walls 74 and 82 of the adaptor extend to over-lie the in-turned flanges 70, 72 of the trim strip 30 to inhibit removal thereof.

It will also be noted that the fins 68 extend laterally of the body 40 to serve as insulation against electrolytic corrosion between the trim strip 30 and the support 22, the fins 68 being "sandwiched" therebetween as shown in Figure 2. This arrangement spaces the trim strip 30 from the support 22, thereby allowing circulation of air therebetween to evaporate moisture and inhibit corrosion.

Figures 7, 8 and 9 illustrate a method of attaching the adaptor disclosed in Figures 1 to 6 to the support 22. The head portion 52 of the first slot 42 of the adaptor is received over the enlarged head of the first button, as shown in Figure 7. The adaptor is then shifted in the direction of the arrow 76 to seat the button head on the button seat 54, as shown in Figure 8.

The adaptor is then pivoted about the button seat 54 toward the second button, in the direction of the arrow 78. It can be seen from Figure 8 that in this embodiment the adaptor must be simultaneously bent away from the support 22 so as to fit the head portion 60 of the second slot 44 over the enlarged head of the second button 24. The flexibility required to allow this motion is provided by the U-shaped tongue portion 46.

The adaptor is now further shifted along an arc shown by arrow 78 to seat the second button head on the button seat 62 of the second keyhole slot, as shown in Figure 9. It can be further seen from Figure 8 that the path of the button along said arc intersects with the resilient finger 58, and that the finger 58 will present little resistance to seating the button 24 on the button seat 62, but will provide substantial resistance to removal of the button from the button seat.

The adaptor 20 provides for substantial variations in the distance between the pair of adjacent buttons, while assuring a firm connection of the adaptor 20 to the support 22. As described above, the adaptor 20 is tensioned against the support 22 by the inclined ramps 50 and 66 of slots 42, 44. After the adaptor is seated, as shown in Figure 9, the second slot 44 prevents removal

of the button from button seat 54 of the first slot 42. The button seat 54 is long enough to provide for substantial variations in the distance between the two buttons. Further, as explained hereinabove, the finger 58 prevents accidental unseating of the second button. Thus, the seating of the adaptor will be substantially unaffected by vibrational or other forces such as may be encountered for example in the field of attaching trim strips to motor car body panels.

While various materials can be used for all parts of the assembly, the motor car industry utilises metal primarily for the support 22 and the trim strip 30. Steel is primarily used for the support, with stainless steel or cold rolled zinc plated steel being used for the button. A suitable material for the adaptor is a thermoplastic resin, such as fibre-filled Nylon, polycarbonates, acetal resins, and polypropylene.

WHAT WE CLAIM IS:—

1. A resilient adaptor for fastening a hollow member to a support which has a surface to which to spaced apart male elements have been attached, each of the male elements having an enlarged head spaced from the surface of the support, the adaptor having two spaced apart slots each bounded by a seat portion adapted to be received under the head of one of said male elements, the slots being so angularly disposed in relation to one another that with a first one of the said seat portions received under the head of one of said male elements, the adaptor can be swung about such element to cause the other seat portion to be received under the head of the other male element, the adaptor also comprising means for inhibiting the withdrawal of said other seat portion from the head of the male element under which it has been received to restrain accidental detachment of the adaptor from the male elements.

2. An adaptor according to claim 1 in which the slot bounded by said other seat portion is arcuate to permit introduction of said other male element as the adaptor is swung as aforesaid.

3. An adaptor according to claim 2 the inhibiting means of which is provided by a resilient finger which projects into the arcuate slot and which flexes to allow it to pass said other male element as the adaptor is swung as

aforesaid, the finger resisting subsequent withdrawal of the element from the slot.

4. An adaptor according to any one of the preceding claims in which the two slots are keyhole slots, the seat portions bounding the narrow parts of the slots.

5. An adaptor according to claim 4 in which the slots are bounded by ramp portions leading to the seat portions.

6. An adaptor according to any one of the preceding claims in which the seat portion received under the head of said one of said male elements is provided by a resilient slotted tongue accommodated in an aperture in a body portion of the adaptor, flexing of the tongue facilitating the passage of the adaptor over the head of the other male element when the tongue has been seated under the head of said one of said elements.

7. An adaptor according to any one of the preceding claims shaped to provide parallel walls over which a channel-shaped trim strip can be clipped.

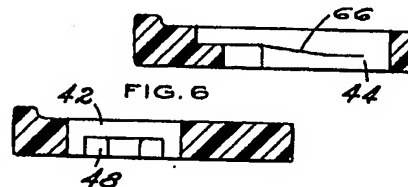
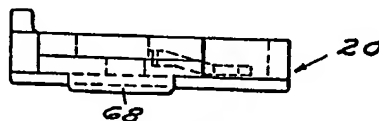
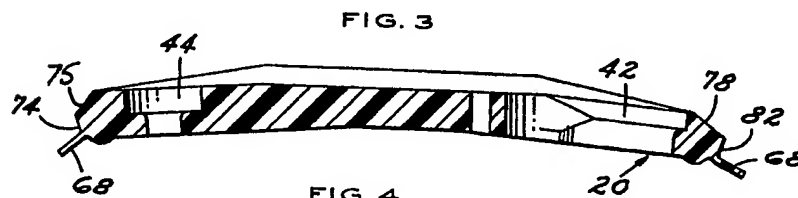
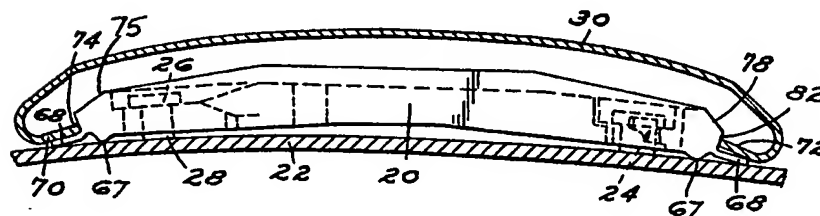
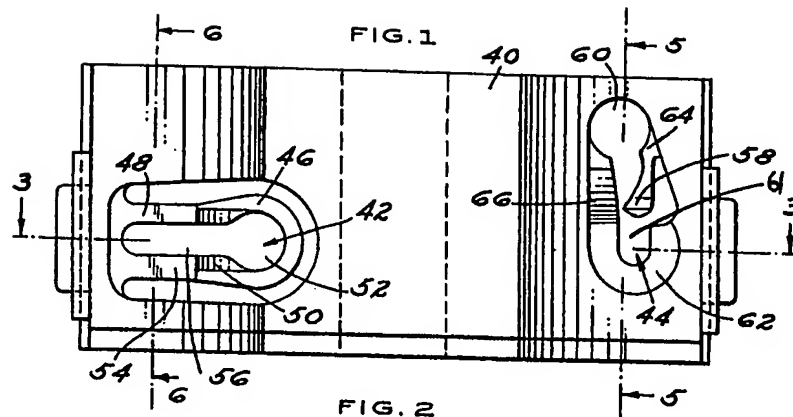
8. An adaptor according to claim 7 having fins along each of said walls, the fins being so disposed that they become sandwiched between said surface and the trim strip when the strip is clipped on to the walls.

9. An adaptor for fastening a hollow member to a support, substantially as hereinbefore described with reference to the accompanying drawings.

10. A fastening assembly comprising a support from a surface of which two headed male elements are secured with their heads spaced from the surface, an adaptor according to any one of claims 1 to 6 with its seat portion received under the heads of said elements, and a hollow member mounted on the adaptor.

11. A fastening assembly according to claim 10 in which the support is a motor car body panel, the male fastener elements are buttons welded to the panel, the adaptor is one according to any one of claims 7, 8 and 9 and the hollow member is a channel-shaped trim strip.

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COMPLETE SPECIFICATION

2 SHEETS

This drawing is a reproduction of
the Original on a reduced scale
Sheet 2

FIG. 7

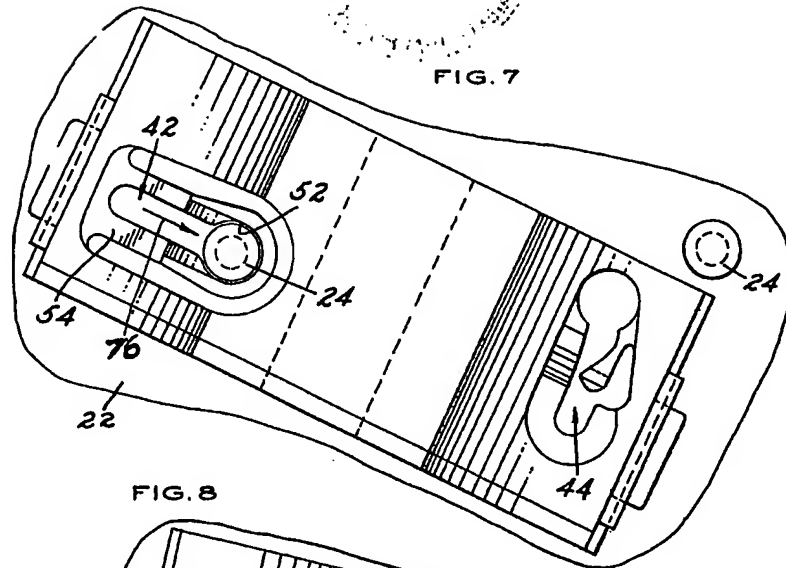


FIG. 8

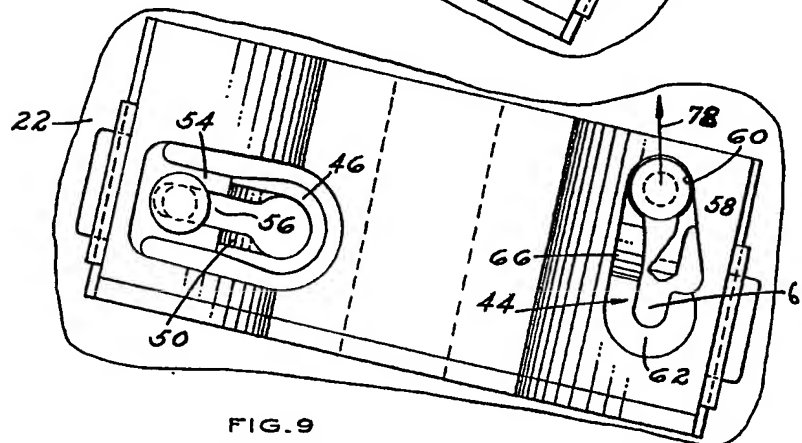


FIG. 9

